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The development cycle of *Psilochasmus oxyuris* Creplin, 1825

Cykl rozwojowy *Psilochasmus oxyuris* Creplin, 1825

The following five genera: *Psilostomum* Loos, 1899, *Psilochasmus* Lühe, 1909, *Apopharynx* Lühe, 1909, *Psilotrema* Odhner, 1913 and *Sphaeridiotrema* Odhner, 1913 were assigned to *Psilostomidae* by Odhner (1913), the author of the family. In the following years *Testifrondosa* Bhalearo, 1924, *Lyperorchis* Travassos, 1925, *Psilorchis* Thapar et Lal, 1935 and *Skrjabinomerus* Sobolev, Mashkov V. et Mashkov N., 1939 were added to them. The most common among these genera are *Psilostomum, Psilotrema* and *Psilochasmus* represented by numerous species living mainly in birds and also in mammals. So far the development cycle of only *Spilotrema spiculigerum* (Mühling, 1898), *Psilostomum ondatrae* Price, 1931 and *Spaeridiotrema globulus* (Rudolphi, 1819) has been described.

The mature form of *Psilotrema spiculigerum* lives in *Nyroca nyroca* (Güld.) and its cercaria occurs in *Bithynia tentaculata*. The cercaria was described before its mature form was known by de Filippi in 1857 as *Cercaria tuberculata* and only Mathias (1925) explained that the cercaria belonged to *Psilotrema spiculigerum* and gave some other details of its cycle. On leaving the primary host the cercaria produces a cyst, transforms into a metacercaria and adheres to water plants with which — it may be supposed — it is eaten by the final host.

The life cycle of *Sphaeridiotrema globulus*, found in various species of *Anseriformes (Anas acuta* L., *Nyroca fuligula* (L.), *Nyroca hyemalis* (L.), *Nyroca marila* (L.), *Mergus serrator* L., *Mergus merganser* L., *Alca torda* L.) was determined by Szidat (1937). *Bithynia tentaculata* is the primary host and the same snail species, in which

it gets encysted on the internal side of the shell, is the secondary host. (The cercaria was previously described by Dubois in 1949 as *C. helvetica* XVII).

The life cycle of *Psilostomum ondatrae* was determined by Beaver in 1939. The snail *Helisoma antrosum percarinatum* is the primary host, and fish, in which the cercaria gets encysted throughout the muscles, is the secondary one. The cercaria was first described by McMullen as *Cercaria thomasi* in 1938. *Psilostomum ondatrae* was found in North America in *Ondatra zibethica* and birds.

Psilochasmus oxyuris (Creplin, 1825) is a species common throughout Europe. It was found in many final hosts such as *Nyroca marila, N. fuligula, N. clangula* (L.), *N. hyemalis, Tadorna tadorna* (L.), *Oidemia nigra* (L.) *Anas platyrhynchos* L., *A. platyrhynchos domestica* L., *Gallus gallus domesticus* L.

Table I

The occurrence of *Ps. oxyuris* in birds in the Mazury Lake District

Lake	Number of birds		Number of *Ps. oxyuris* specimens
	examined	invaded	
Lake Drużno (1950, 1951, 1953) *Anas platyrhynchos*	58	4	17
Lake Gołdapiwo (1954—55)	37	15	950
Anas platyrhynchos	4	1	19
Nyroca fuligula			
Lake Mamry Północne (1956) *Anas platyrhynchos*	4	3	123

It was observed by Sulgostowska (1958) in *Anas platyrhynchos* from Lake Drużno in the Mazury Lake District. It was also found at Lakes Gołdapiwo and Mamry Północne there. In the bird biocoenosis it occurred in a varying number, at Lake Gołdapiwo more frequently than elsewhere (Table I). It follows from its occurrence figures that *Anas platyrhynchos* is the main final host.

The development cycle of *Psilochasmus oxyuris* had not been described before. I determined it during my research on the parasitofauna of Lakes Gołdapiwo and Mamry Północne in 1954—1956.

The parasitofauna of the lakes was examined not only in birds but in other hosts of vertebrates and invertebrates as well. All species of *Insecta, Crustacea, Mollusca, Oligochaeta and Hirudinea* (normally primary and intermediate hosts of flukes) found at Lakes Gołdapiwo and Mamry Północne were examined in 1954—1956 (Table II). They were collected at various stations and from various environments.

Table II

The number of invertebrates examined at Lakes Gołdapiwo and Mamry Północne in 1954—56

	Gołdapiwo (1954—55)		Mamry Półn. (1956)		Total
	Species examined	Specimens examined	Species examined	Specimens examined	
Insecta	30	23,339	30	1,890	25,229
Crustacea	27	42,339	32	13.011	55,350
Mollusca	19	9,361	17	4,234	13,595
Oligochaeta	9	2,905	9	769	3,674
Hirudinea	15	1,625	16	463	2,088

When the occurrence of various parasitic stages in various hosts was known the course of the development cycle could roughly be determined. No experiment needed to be made, as a morphological comparison made it possible to link various development stages to

Table III

Snails invaded by *Ps. oxyuris* cercariae and metacercariae found at Lakes Gołdapiwo and Mamry Północne

	Number of snails found						Number examined
	with cercariae			with metacercariae			
	Gołdapiwo	Mamry	Total	Gołdapiwo	Mamry	Total	
Bithynia tentaculata	5	2	7	1	4	5	352
Radix sp. (*R. ovata, auricularia, ampla*)	—	—	—	1	2	3	327
Spiralina vortex	—	—	—	—	1	1	679
Total	5	2	7	2	7	9	

each other: cercaria to metacercaria, metacercaria to mature form. The morphological features of the cercariae and metacercariae are distinct enough not to arouse any objections and doubts as to their identification and assignment to *Ps. oxyuris*.

Bithynia tentaculata proved to be the primary host and the snail species *Bithynia tentaculata, Radix* sp. sp. and *Spiralina vortex* (Table III) were found to be intermediate hosts. No metacercariae were found among representatives of the plankton or among other species of the benthos. The great number of specimens examined in a fairly great variety of species (Table II) warrants the supposition that the primary and intermediate hosts found exhaust the list of species necessary to complete the life cycle of *Ps. oxyuris*.

Still, experiment was resorted to find out whether other hosts occurred in addition to those found. Representatives of various species of *Gastropoda, Crustacea, Oligochaeta* and *Hirudinea* were kept for this purpose in a vessel together with an invaded snail, and exposed to the action of the coming-out cercariae.

Experimentally only snails, and among them *Bithynia tentaculata, Radix ovata, R. ampla* and *R. auricularia*, were obtained as intermediate hosts. The occurrence of metacercariae in a natural biocoenosis in the above species was confirmed and moreover a metacercaria was found in *Spiralina vortex* (Table III). Still other snail species may be intermediate hosts, but this supposition was not confirmed experimentally or in natural conditions.

It can be gathered from the frequency of invasion and the way of life of the snails that the order of importance of various species as intermediate hosts is: *B. tentaculata* and then *Radix* sp. sp. The role of *Spiralina vortex* is rather incidental and it is important when the other species are absent.

No cercariae or metacercariae were observed at Lake Drużno and mature forms were few as well. In proportion to mature flukes found in birds, most larval forms, cercariae and metacercariae were found at Lake Gołdapiwo and then at Lake Mamry Północne.

Cercaria

Bithynia tentaculata is the only primary host of *Psilochasmus oxyuris*. Cercariae occurred in about 2 per cent of specimens examined from the snail species investigated at Lakes Gołdapiwo and Mamry Północne. It is a high percentage for invasion by cercariae

and consequently cercariae and mature forms (Table I) may be considered a fluke species common in the biocoenosis of these lakes.

The cercariae coming out of the snail represent one of the largest forms occurring among cercariae. Its large dimensions and the fact that its body is filled with cystigenous secretion may make the cercaria behave sluggishly in the water and swim slowly. The movements of the cercaria depend on those of its tail, which draws the sign of infinity and thus causes the cercaria to dart to the right and left alternately. These movements, very typical of most cercariae appear to be made with difficulty in this one and consequently it swims sluggishly and clumsily. The movements of the tail and of the cercaria may be followed quite easily in water. Darting back and forth the cercaria swims persistently and almost without stopping for hours.

The size of the cercaria is 0.46 — 1.10 by 0.3 — 0.12 + 0.53 — 0.77 mm. The varying dimensions do not apply to one and the same specimens and express differences in size between specimens from the same snail in various periods of growth and development. A fully mature cercaria, capable to produce a cyst and transform into a metacercaria, is 0.63 by 0.33 — 1.10 by 0.12 + 0.53 — 0.77 mm. The first figures stand for the maximum length of body, the second ones express its width, while those following the symbol + refer to the length of tail. Stages smaller than the dimensions given are immature; they die in water after mounting.

The cercaria belongs to *Gymnocephalacercariae* and has a tail furnished with a fin (Figure 1). Its body is an elongated oval, it does not show any great contractility and hardly change its shape and dimensions. The body tissue is thick and hardly flexible. The thickness of the body and its small variability are accounted for by the accumulation of a large quantity of cystigenous secretion diminishing the flexibility of the body. Cystigenous glands, characteristic of *Gymnocephalacercariae* appear in packs grouped in 8 to 12 rows running lengthwise and filling the body in several layers one above another. The cystigenous secretion lends a dark colour to the body or makes it brown. The organs uncovered by the glands clearly set off against them. These are first of all both suckers showing as bright spots and lying quite behind the reach of the glands. Far less distinct are the alimentary tract and the excretory system since they are both situated on the layers of the packs or are partly covered by them.

Two kinds of cystigenous secretion may be distinguished in some of the species of *Gymnocephalacercariae*, e. g. in the cercaria *Parafasciolopsis fasciolaemorpha* Ejsmont: one finely granular, the other bacilliform (Wiśniewski, 1937). Either of these types of secretion forms in turn a different sort of screen in the cyst of metacercaria. Granular secretion only appears in *Ps. oxyuris* cercariae. This secretion is produced in cells in which the whole of plasmatic content changes into it. In not fully mature cercariae it is brown, but later on it becomes darker and consequently the body of mature cercariae is of a darker hue.

According to Mathias (1925) the cercaria *Psilotrema spiculigerum* has glands (their description coinciding with the cystigenous glands) with efferent ducts terminating on the dorsal side of the oral sucker. I believe this is a mistake in observation as the cystigenous glands have no ducts in cercariae, in *Gymnocephala* in particular. The process of secretion was described for *Parafasciolopsis fasciolaemorpha* (Wiśniewski, 1937) and now confirmed in *Pl. oxyuris*.

The degree of maturity of carcariae may be determined from the behaviour of the secretion. It lies in the packs in immature forms while the packs burst and their content gets among the cells of parenchyma. Pushed hence by the movements of the body the granules of te secretion get into cuticle between its separate layers and make the cuticular body cover distincly thicker. Penetration between the separate cuticular layers prevents fine single granules from coalescing into a compact mass. Cercariae get out of the snail into the water at that stage. Pressed by the secretion coming out of the packs they are thrust outside the cuticle, combine with the neighbouring granules and coagulate into long, thin, fine stripes in the water. As the secretion continues to come out these stripes stick to one another, concrete, and make a compact wall of the cyst. The successive layers may be distinguished in the cyst and the origin of its walls determined thereby.

In contact with water the secretion changes its physical properties, for when a mature cercaria gets into the water the cystigenous substance develops the power of adhesion, and it is only then that it can form a cyst.

The alimentary tract is well-developed already in the cercaria. It opens at the apex of the oral sucker, passes into the praepharynx,

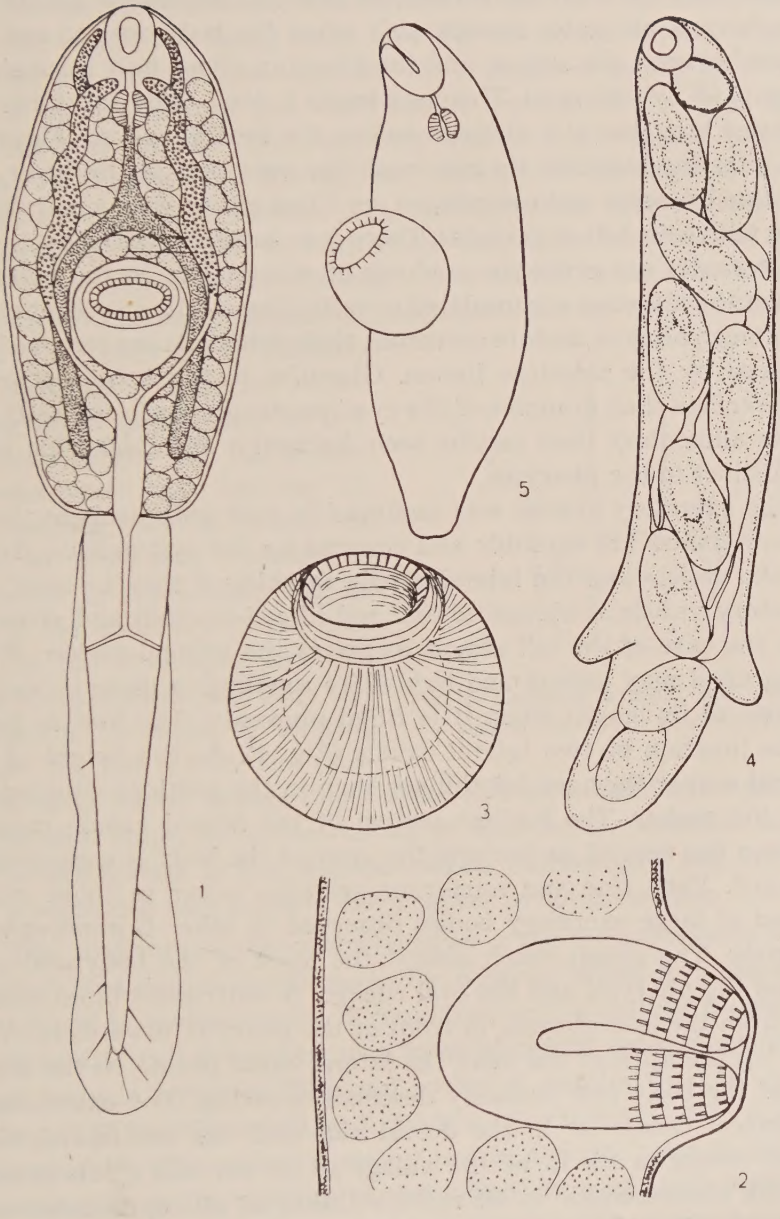

Fig. 1—5. *Pislochasmus oxyuris* (C r e p l.): 1. Cercaria from *Bithynia tentaculata*. 2. Ventral sucker and system of sphincter muscles. Optical section. 3. System of circular and longitudinal muscles in ventral sucker. 4. Redia with young cercariae. 5. Metacercaria removed from the cyst.

which passes into a strongly muscular pharynx behind the sucker. The praepharynx elongates considerably when the body does so and protrudes between the sucker and the pharynx about half through the latter (0.05 by 0.05 mm). The oesophagus is long, wide and forks into intestine branches at a distance before the ventral sucker (Figure 1). The intestine branches do not reach the very end of the body. The intestine branches and oesophagus are filled either with small granules or with cells full of granules. There is no lumen in the intestine yet. The granules are probably products of metabolism in the maternal cells of the intestine accumulated in cells. These cells are degenerated in metacercariae or mature cercariae, their remnants are removed and replaced by the intestine lumen. Granules in the intestine are of a darker hue than granules of the cystigenous glands in the body and so the alimentary tract can be seen distinctly. Muscular cells become distinct in the pharynx.

The excretory system was analyzed in part only because the vibratory flames are invisible and covered by the cystigenous glands. Yet the vesicle and the lateral canals reaching it may be seen. The excretory vesicle is elongated and rod-like (I-shaped) and stretches from the base of the tail almost as far as the ventral sucker. When filling up it may extend and buble-like swellings appear in various sections of its length when it is filled unevenly. The vesicle forms at the junction of two lateral canals (Fig. 1). At the height of the ventral sucker they are far thinner than in the portions situated behind the sucker. The further section of the lateral canals running between the ventral sucker and the apex of the body is considerably enlarged. Very fine and numerous granules occur in those canals instead of large excretory bodies observed in other *Gymnocephala-cercariae*. The canals reach almost the apex of the body and pass around the pharynx and the oral sucker. A centripetal blind branch goes from the lateral canal in front of the pharynx towards it. After reaching the apex of the head the lateral canal passes on the dorsal side of the body and probably descends tapering. The extension of the lateral canals on to the dorsal side and the centripetal blind branch seems to me to be the anlage of an exrectory subcuticular network characteristic in all mature flukes of all representative of the family *Psilostomidae;* it is well-developed in *Ps. oxyuris* and described in detail by Odhner (1913). Besides those excretory canals there are no pointers in metacercariae indicative of the anlage of subcuticular excretory network.

The excretory system extends into the tail as well. From the excretory vesicle the canal leads into the tail as an extension of the vesicle and at a third or a quarter of its length from the base of the tail it bifurcates into two short canals terminated by openings on the sides of the tail. The excretory vesicle is a straight and wide canal. As it passes into the tail the extension of the canal in the tail is far wider than its further part. A termination very characteristic of mature flukes starts to form at the end of the body on the dorsal side of metacercaria. As is known the terminal section is pointed as a spine and turned ventrally in fullgrown *Ps. oxyuris*. The termination of the body has no distinctive features in cercariae swimming about in the water as it is covered by the tail, but in specimens which have lost the tail an opening may be noticed on the ventral side resembling a sucker in appearance (Fig. 6). As it lies ventrally to the base of the tail it escapes attention and is mistaken for the body termination. Its shape is striking when the tail is lost. The muscled walls, which change into a spine-like termination at a later development stage, in metacercariae or final hosts, resemble suckers. This termination is not well-developed in cercariae yet, and only an invaginated base appears like a sucker in optical section.

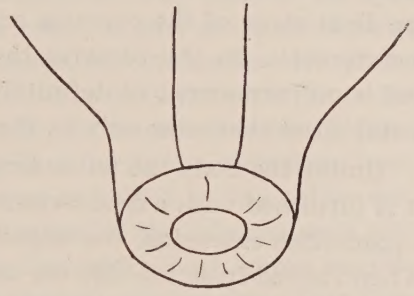

Fig. 6. Cercaria without tail. Terminal section of body. Ventral view.

The structure of the ventral sucker is the second feature to help identify and assign specimens to *Ps. oxyuris*. When it appears fully developed in metacercariae it resembles one in mature flukes. Both suckers are well-developed in a form of bright patches against the dark body in cercariae. The oral sucker is smaller than the ventral sucker (0.12 by 0.09 to 0.09 by 0.13 and 0.16 by 0.20 to 0.20 by 0.17 mm, respectively). The mouth opening lies in the oral sucker, but it is separated from the opening of the sucker. It is situated terminally, turned upwards and can extend considerably. The sucker has strong muscles, the fibres are distinct. The muscles of the ventral sucker are even more developed and differentiated into longitudinal and circular muscles and consequently they may act as a sphincter. View-

ed from the side the sucker seems to occupy at least a half of the thickness of the body and its section protruding outside shows a specific muscular system (Fig. 2 & 3). In a finally developed cercaria there are circular muscles outside and longitudinal ones inside the sucker. A combination of contractions of these muscles in this system enables the sphincter to function: to close or dilate the opening of the sucker. In optical section bundles of these muscles form lines and rows which look like a system of spines but are in fact the longitudinal and transverse muscles seen in optical section. Although the muscle sphincter in a mature cercaria is developed enough to know its character, the process of its formation continues through the final stage of the cercaria and it is fully developed only in the metacercaria. In the cercaria the sphincter appears for some time and is no permament of definitely developed feature and it assumes a stabilized character only in the metacercaria.

Unlike the body the tail is bright. It is about as long as the body. It is furnished with a dorso-ventral cuticular fin. The fin constitutes a spade-like extension, the widest in the terminal section of the tail. When viewed from the side the tail seems to be of the same thickness or width and looks like a rod, but the character and structure of the stem of the tail and those of the cuticular fin adherent to it differ from each other.

Rediae (Fig. 4), in which cercariae develop, are relatively small, indistinct and play no major part in development. They are cylindrical in shape and have a small pharynx, a short intestine, procruscula, but no collar. There are a small number (8 to 12) of immature cercariae. Rediae were found in snail liver and with them a varying number of cercariae at various stages of development. These were generally bigger in size and more developed than those in rediae. It may be supposed that cercariae leave rediae when immature, grow and mature in snail liver, for cercariae at different development stages are to be found in it. As this phenomenon recurs continually there can be no doubt that the maturation of cercariae, i.e. their reaching a stage when they can get into the water and change into metacercariae, takes place in the liver of the first host and not in the redia.

Dimensions of rediae: 1.0 — 1.9 by 0.16 — 0.25 mm; pharynx: 0.07 by 0.07 mm.

Metacercaria

The production of a cyst and the formation of a metacercaria begins a few hours after a cercaria leaves the primary host, the snail, and finds the secondary one. If no secondary host is found the process may start in the water but it never ends by the formation of a normal cyst then. A metacercaria may be formed then, only if the secondary host is found.

The production of a cyst takes four to five hours and covers two successive stages. The first is marked by the secretion passing from the glandular packs to the cuticle and the other by the issue of the secretion from the cuticle and the coagulation into walls of the cyst. The former process takes place in a cercaria during the final stage of its stay in the primary host and conditions the maturation of the cercaria. The other process takes place in the secondary host as a rule. Both process may partly shift or overlap in a cercaria when it stays in the water on leaving the primary host or in the secondary host. The coagulation and formation of a cyst is helped by the active movements of the tail, the passive movement of the cercaria and probably the surface of the shell of the secondary host where encystment takes place. The movements of the tail sticking for a long time in the body of the cercaria bring about regular vibratory movements of the body and so the secretion thrust outside may be spread evenly on the body surface of the cercaria. The rough internal wall of the snail shell to which the secretion adheres offers resistance to the movements of the cercaria and brings about the mechanical pressure resulting in further secretion. At that point the tail gets detached from the body and extrudes or is thrust outside the shell into the water. It continues its movements, but then all movement stops and it sinks to the bottom of the vessel.

The passing of the cercaria into the water and its stay there involve some biochemical reaction, for only when the cercaria gets into touch with water the cystigenous substance develops viscous properties enabling it to produce a cyst. Therefore it is one of the stages of its maturation and enables it to change into a metacercaria. No cercaria in which these changes failed to take place could be considered mature even when the secretion has begun to come out of the packs and the cuticle. What may be observed then is the coagulation and clotting of the granular secretion in fairly irregular forms and the formation of fragments of a cyst only. But the secretion cannot

form into stripes and no normal cyst can be produced. In such cases, the cercaria dies in the water enclosed in incomplete, irregular cyst walls looking like a thickened armour.

The formation of a regular cyst takes place only on the internal side of the snail shell or on the surface of the mantle of the secondary host to which adhere cysts of metacercariae. I never saw a normal cyst be produced in water after cercariae got into it, in contradistinction from *Cercaria monostomum* or *Cercaria Diplodisci subclavati* or other cercariae that get encysted in water or on objects in it. When there was no proper intermediate host cercariae kept on swimming about in water for a long time, partly issued the secretion and, exhausted by swimming, died after they cast away the tail.

When much secretion is issued outside the appearance of the metacercaria changes (Fig. 5); it becomes distinctly thinner but its length remained unchanged.

The walls of the cyst are fairly thick (up to 0.025 mm). The cyst is large, round or almost round; its wall refracts light doubly and this helps distinguish sections of inner and outer wall in it. It differs considerably from the cyst of *Parafasciolopsis fasciolaemorpha*, which differentiates into two cysts, inner and outer, the latter covering the former with a kind of a hat (Wiśniewski, 1937). Both cysts are identical in *Ps. oxyuris* and either refracts light in a different way. They are identical in structure because the type of cystigenous secretion and the formation of the cyst in the intermediate host are the same. That the cyst is different in structure in *P. fasciolaemorpha* results from its adaptation to producing the cyst on the surface of the water and its adhesion to water plants.

Dimensions of cyst: 0.33—0.35 by 0.35—0.33 mm. Thickness of walls of cyst: 0.07 (outer) + 0.04 (inner) = 0.11 — 0.015 (outer) + + 0.010 (inner) = 0.025 mm.

When the cercaria stays in the snail for a few days the walls of its cyst become brittle enough for it to be mounted; but it is not easy.

A mounted metacercaria is brighter than a cercaria. Its dark hue turns dark grey and this is due to the fact that the granules of the secretion, not quite removed yet still, stick in parenchyma in part. The size of the metacercariae mounted varies from 0.7 to 0.8 by 0.2 to 0.3 mm. The oral sucker (0.12 by 0.10 mm) and the ventral sucker (0.21 by 0.18 mm) are very distinct (Fig. 5). The sphincter on the ventral sucker is almost stabilized. The sucker is set deep in the body

and is a very large organ for the body. I observed no characteristic spine-shaped termination in the terminal section of the body; either it is not developed yet or it is drawn inside the body. There are no reproductive organs either, not even their anlages.

Comments for discussion

1. In one of his studies on the natural system of flukes Odhner (1913) claimed that *Psilostomidae* resembled *Echinostomidae,* but, on the other hand, as they had a subcuticular excretory network they were related to *Strigeidae.*

It is noteworthy that their relationship to *Echinostomidae* is beyond any doubt whatever. This is suggested by a number of common features occurring in both families such as:

— (a) the same basic type of excretory system; according to the nomenclature of Sevell (1922) accepted by Dubois (1929) it was called „Stenostoma type". As a matter of fact it should be called „Fasciolata type". The type occurs in *Fasciolidae, Psilostomidae, Echinostomidae* and the following system is characteristic of it: the vibratory flames scattered in the parenchyma accumulate in either side of the body in an efferent duct of the first order running in its main course from the back to the front of the body. At the height of the oral sucker it turns backwards as a lateral canal, enlarges and contains granular excretory bodies. Behind the ventral sucker both lateral canals join into an odd one which either functions as excretory vesicle or empties into the enlarged section of the canal functioning as excretory vesicle.

— (b) Cercariae develop in rediae.

— (c) They have well-developed cystogenous glands.

— (d) They have either no penetrating glands at all or some in the shape of small underdeveloped cells.

— (e) Their intermediate host is the snail or there is no intermediate host at all and the metacercariae encyst in water, on plants or objects in it.

The occurrence of so numerous features suggests that the three families *(Fasciolidae, Psilostomidae* and *Echinostomidae)* follow the same development line and it was legitimate for Skrjabin et Schultz (1937) to create a large taxonomic unit called *Fasciolata.*

But for Odhner (1913) to relate *Psilostomidae* to *Strigeidae* through *Cyathocotylidae* ignores the assumption that the system

should be natural. In particular, the opinion that *Strigeidae* come from *Psilostomidae* is quite incorrect. Odhner's only argument is some external similarity between parts of the excretory and subcuticular networks in *Cyathocotylidae* and *Psilostomidae* respectively. Yet both families differ largely in ontogenetical development, i. e. in the type of parthenites, in the type of cercariae, in the structure of the excretory system (in which Odhner sees similarity) and follow different development lines. The similarities between *Sphaeridiotrema* and *Cyathocotyle* aduced by Odhner refers to features of minor importance and are of no real account. More plausible is the view of Szidat (1937), who regards the formation of a partly similar excretory system in *Psilostomidae* and *Strigeidae* as the phenomenon of convergence.

2. *Psilostomidae* differ from other families of *Fasciolata* in some well-defined features. These indicate that the family represents its philogenetic line. Beside the anatomic features there are also biological ones. In most of the life cycles known hitherto:

— (a) A representative of *Prosobranchia (Bithynia tentaculata)* is the primary host; *Psilostomum ondatrae*, developing in *Helisoma*, being the only exception so far.

— (b) Snails, in which metacercariae encyst on the internal side of the shell, are the secondary hosts; *Psilostomum ondatrae*, encysting in the muscles of fish, constitutes an exception again.

— (c) The cercaria possesses only one kind of cystigenous glands and produces one screen only which refracts light doubly. Anlages of a subcuticular excretory network may be observed as processes diverging from the lateral ducts. These are well-developed in *Ps. oxyuris*. The ventral sucker is better developed than the oral one.

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STRESZCZENIE

Psilochasmus oxyuris występuje pospolicie na Pojezierzu Mazurskim, zwłaszcza w biocenozie jeziora Gołdapiwo i Mamry Północne. Głównym żywicielem ostatecznym jest *Anas platyrhynchos*, żywicielem pierwszym jest *Bithynia tentaculata*, żywicielem pośrednim — ten sam gatunek ślimaka, a również w dalszej kolejności *Radix ovata*, *Radix ampla*, *Radix auricularia* i *Spiralina vortex*.

Cerkaria należy do *Gymnocephalacercariae* i charakteryzuje się posiadaniem płetwy grzbieto-brzusznej w ogonie. Należy do największych cerkarii. Gruczoły cystogenne są liczne i zawierają sekret ziarnisty, który wytwarza jednolicie zbudowaną cystę na wewnętrznej powierzchni skorupki żywiciela pośredniego. U cerkarii występuje zwieracz w przyssawce brzusznej, tworzą się zawiązki subkutikularnej sieci systemu wydalniczego oraz zaznacza się tworzenie zawiązka kolczastego zakończenia, charakterystycznego dla dojrzałej przywry.